Directorate of Intelligence

Secret

25X1

# Additional Missile and Space Related Support Programs Identified at Zagorsk, USSR (S)

**A Research Paper**

**Secret**
*IA 84-10072*
*September 1984*

*Copy* 41

Sanitized Copy Approved for Release 2010/12/17 : CIA-RDP91T01115R000100320004-6

**Warning Notice**

Intelligence Sources
or Methods Involved
(WNINTEL)

**National Security Information**

Unauthorized Disclosure
Subject to Criminal Sanctions

**Dissemination Control Abbreviations**

| | |
|---|---|
| NOFORN (NF) | Not releasable to foreign nationals |
| NOCONTRACT (NC) | Not releasable to contractors or contractor/consultants |
| PROPIN (PR) | Caution—proprietary information involved |
| ORCON (OC) | Dissemination and extraction of information controlled by originator |
| REL... | This information has been authorized for release to... |
| FGI | Foreign government information |
| WN | WNINTEL—Intelligence sources or methods involved |

25X1

All material on this page
is Unclassified.

Directorate of
Intelligence

Secret

25X1

# Additional Missile and Space Related Support Programs Identified at Zagorsk, USSR (S)

A Research Paper

25X1

Secret
*IA 84-10072*
*September 1984*

25X1

# Additional Missile and Space Related Support Programs Identified at Zagorsk, USSR (S)

**Summary**

*Information available as of June 1984 was used in this report.*

The Zagorsk Missile and Space Development Center was established in the early 1960s to support emerging Soviet missile and space programs. Since then the center has been involved in developing and testing missile transporters, propellant/oxidizer transporters, silo shock isolation systems, some spacecraft systems, and space launch vehicles and their respective launch sites. Intensive analysis of new and modified facilities at the center, using information through June 1984, has resulted in the identification of additional missile- and space-related support programs at Zagorsk. Maintaining a good understanding of the types of activity being conducted at Zagorsk is important because of the potential tipoff it might provide to the direction and status of important Soviet missile and space programs.

Previous analysis of satellite imagery had revealed a scale model of a launch pad for a space launch vehicle at Zagorsk. More recent analysis of modifications to the model and of associated activity patterns indicates that exhaust gas flow experiments have occurred there over an extended period to aid in developing several space launch vehicles—the SL-X-15, the SL-X-16, and the SL-W—and their associated launch sites.

Another facility currently under construction at the center will replicate part of the propellant loading system at one of the launch sites for the heavy-lift launch vehicle at Tyuratam. This facility will most likely be used for checking connections between the umbilical and the booster, duplicating the flow of pressurized gas and cryogenic liquids through the umbilical, and developing operating procedures for use at the launch site.

A probable impact test facility, constructed at the Zagorsk center between 1979 and 1982, may test either surface penetrators for interplanetary exploration or spacecraft soft landing systems. Surface penetrators for interplanetary applications are sophisticated devices that impact and penetrate the surface of a planet or asteroid in order to measure various conditions on, as well as beneath, the surface. The data is then transmitted to an orbiting satellite for relay to Earth. Extensive testing of such devices is required to ensure that they function after impacting the surface and experiencing force loads of up to 20,000 Gs or more.


*IA 84-10072*
*September 1984*

25X1

Two other facilities at the Zagorsk center, heretofore unidentified, are probably involved in treating and disposing of toxic liquid wastes resulting from experiments with propellant-related chemicals and possibly toxic metals. Construction of these facilities at Zagorsk was probably prompted by increasing Soviet concerns about the disposal of highly toxic effluents related to the development and handling of missile and space launch vehicle propellants. Such facilities may also be built at other missile propellant-related installations if these two prove successful.

25X1

# Contents

# Additional Missile and Space Related Support Programs Identified at Zagorsk, USSR (S)

## Introduction

The Zagorsk Missile and Space Development Center (ZMSDC), located 15 kilometers north of Zagorsk, was established in the early 1960s to support the Soviet Union's then-fledgling missile and space programs (figure 1). Primarily through analysis of imagery—the main source of information available on the Zagorsk center—a variety of tasks related to these programs have been discovered. These activities have included developing and testing strategic missile transporters, silo shock isolation systems, and propellant/oxidizer transporters; testing shroud separation systems; and testing soft landing systems on at least one series of interplanetary probes—the Venera. Testing involving scale models of launch sites for space launch vehicles is also an ongoing part of programs at the center. (S [redacted] 25X1

Closely monitoring activity at Zagorsk is important because of the potential tipoff it might provide to the direction and status of key Soviet missile and space programs. A number of new facilities have been constructed and existing ones modified since 1970 at the ZMSDC. The facilities examined during the preparation of this report include a scale model of a space launch pad, which has been modified and used for testing in at least three separate phases; a facility for testing certain ground support equipment for the new heavy-lift launch vehicle (HLLV); a probable impact test facility for surface penetrators or spacecraft soft landing systems; and two previously unidentified structures most likely for treating and disposing of toxic liquid wastes. (S [redacted] 25X1

## Probable Exhaust Gas Flow Experiments

A scale model of a launch pad was built at Zagorsk in 1967. The facility is referred to in the Intelligence Community as the J minipad, because it was modelled after a launch pad at Space Launch Site J, Tyuratam Missile and Space Test Center (TTMSTC). The TTMSTC is the major Soviet flight test center for space launch vehicles; Launch Site J was built there in the mid-1960s for the SL-X-15, the first Soviet HLLV. The SL-X-15 was to have been comparable to the US Saturn V, but after several unsuccessful launch attempts the SL-X-15 program was cancelled in 1974. Launch Site J, including its exhaust flumes, is currently being modified for the new Soviet HLLV, the SL-W. (S [redacted] 25X1

At least three distinct phases of modification and related test activity have occurred in the J minipad area since 1967: from 1972 through mid-1979; from mid-1979 through early 1982; and from early 1982 to the present. These phases are probably related to exhaust gas flow experiments for the new space launch vehicles (SLVs) and launch sites currently in

---

***Shrouds and Soft Landing Systems***

*Some spacecraft have multi-section shrouds around portions of them to protect certain external components during the launch phase. The shroud sections must separate and be jettisoned after launch—usually during the powered portion of the flight—in order for the components to function in space. To ensure an operable spacecraft, the sequence of events related to shroud separation is usually tested at some point in the development program of a spacecraft.* (U)

*Spacecraft soft landing systems are either passive or active. Passive systems, including parachutes and air foils, make use of the existing atmosphere to slow the spacecraft to a safe velocity for landing on a body. In the absence of an atmosphere, however, active systems must be used. These systems utilize retrorockets that are fired in the direction of descent to slow the spacecraft for landing.* (U)

---

Page Denied

Sanitized Copy Approved for Release 2010/12/17 : CIA-RDP91T01115R000100320004-6

development.[1] Similar experiments, also using models, were conducted in the mid-1970s and again in 1981 at the Marshall Space Flight Center, a National Aeronautics and Space Administration test facility in Huntsville, Alabama, to aid in developing the US Space Shuttle and its launch facilities. (S [redacted]

Initial modification and associated test activity at the J minipad area involved installing two narrowly spaced rails in early 1972 just west of the site, removing the existing tripod tower, and erecting a larger framework tripod tower between March 1973 and January 1974 (figure 2). Exhaust gas flow experiments were probably conducted using this new tower and the existing model exhaust flumes until mid-1979. The function of the rails is not clear, but they could have been used to mount movable instrumentation equipment for tests at the site. (S [redacted] 25X1 25X1

By August 1979, as part of a second phase of modifications and testing, skirts had been erected around at least part of the tower base. Guide blocks or tracks for positioning a device to be delivered later were also being placed in front of the tower (figure 2). Construction materials for the probable impact test facility under construction nearby were being stored temporarily on the apron adjacent to the large new tower. In May 1980, what was later identified as a scale model of an exhaust flume was observed in front of Building 9, which is near the ZMSDC entrance (figures 1, 3). The exhaust flume model was 11 meters long, 3 meters wide, and had internal panels or support spars. One end of the flume had a flat, boat-nosed shape, with a step located about 6 meters away. The model 25X1

[1]Two new SLVs are currently in development at the TTMSTC. The SL-X-16 is a medium-lift launch vehicle that will be launched from Space Launch Site Y, and its flight testing could begin before the end of 1984. The SL-W, a new HLLV, will be launched from Space Launch Site W as well as from Space Launch Site J. The HLLV will be used to launch a space shuttle orbiter from Site W, and other large payloads from both Sites W and J. Flight testing of the HLLV from Site W could begin in 1985, but flight testing from Site J, where construction has not progressed as far, is not expected before 1986 or 1987. (S [redacted] 25X1

[redacted] 25X1

exhaust flume was moved to the J minipad area [redacted] where it was positioned on the guide blocks or tracks. (S [redacted]

The flume model was observed with its deepest end under the base of the tower several times between February 1981 and early 1982, when it was last seen. The configuration and scaled size of this model suggest that it was probably used for exhaust gas-flow simulation experiments for the exhaust trough design at Launch Site Y, TTMSTC. At that time the trough at Site Y was in a mid-to-late stage of construction. Alternatively, the mockup could have been used to investigate changes that have since been made to the flame splitter and trough area of Launch Site J, TTMSTC. (A flame splitter is a structure, positioned beneath the launch vehicle, that is used to deflect hot exhaust gasses into an exhaust trough where they are channelled away from the pad during a launch.) The changes at Site J are intended to accommodate the complex gas flow pattern resulting from the launch of the new HLLV at this site. (S [redacted]

A third testing phase at the J minipad was first noted in April 1982, when a completely different model was seen in front of the tower on satellite imagery. The new model consists of a combination launch stand and flame trough (figure 4). The configuration indicates that the model will be used to simulate the deflection and channeling of HLLV exhaust during launch from Launch Site W at the TTMSTC. An exact 1:10 scale model of the unique launch vehicle support pedestal at Launch Site W is present on the launch stand portion of the model. Also related to the test activity in this phase are two vans that are probably used for instrumentation and office space; an unidentified short framework structure adjacent to the model; a small arched-roof object 5 meters long, 3 meters wide, and approximately 1 meter high; and a crane for moving objects onto the model. The small arched-roof object, which has been observed in the flame trough area, probably houses sensors during a test. (S [redacted]

25X1
25X1
25X1
25X1
25X1
25X1

[redacted]

### Heavy-Lift Launch Vehicle Service Equipment Test Facility

A facility being built adjacent to the shroud separation test facility at Zagorsk will be used to test the operation of ground umbilical servicing equipment for the new HLLV (figure 5). Construction of the servicing equipment test facility began in early 1983, was nearly complete by mid-1984, and could be finished by late 1984 or early 1985. (S [redacted]

The facility contains test fixtures which, when completed, will replicate a portion of the propellant loading system which has been installed at TTMSTC Space Launch Site W. The only apparent difference between the two fixtures is the presence of a blast shield over the umbilical at Tyuratam, which will help prevent damage to the umbilical during an HLLV launch. The test fixture at the ZMSDC will probably also replicate a structure at Space Launch Site J, which is currently being modified for the HLLV. In addition, hardware for mounting a test article that will simulate a section of the HLLV core booster has also been installed at the facility. (S [redacted]

The primary test fixture at the facility is an approximately 10-meter-square by 9-meter-high open framework structure which has a 20-meter-long [redacted] triangular appendage attached to it. When completed, this fixture will nearly duplicate that part of the fixed service structure at Tyuratam Space Launch Site W which houses an umbilical for the transfer of liquid oxygen (LOX) to or from the HLLV. The appendage on the square, framework structure probably will be used for mounting a replica of the LOX umbilical used at both HLLV launch sites. An array of nine small mounting points that will probably support a section of the [redacted] core booster of the HLLV is approximately 10 meters from the test fixture. The umbilical and a test section of core booster tankage will most likely be used for checking mechanical and pneumatic connections between the umbilical and booster, duplicating the flow of pressurized gas, cryogenic liquids, or both through umbilical/booster lines, and developing operating procedures for use at the launch sites. (S [redacted] 25X1

This test facility may also be used for testing other ground servicing and possibly booster checkout equipment. With some minor alterations, for example, the test fixture could be used for mounting a liquid hydrogen (LH) umbilical like those at the 25X1
HLLV launch sites. A series of tests similar to 25X1
those that will apparently be conducted with the LOX umbilical could then be done with the LH umbilical. (S [redacted] 25X1

### Probable Impact Test Facility

The probable impact test facility, situated at the extreme west end of the Center, consists of a test site structure that encloses a basin, a rail-mounted service tower, and a traveling crane that can lift heavy objects into and out of the test site (figure 6). Also related to the test facility are a control building connected to the area by an underground utilities conduit, a test preparation building, and a 25X1
buried drainage collection basin. These facilities were built concurrently with the test site enclosure. Testing of surface penetrators for interplanetary exploration or spacecraft soft landing systems may occur at this site. (S [redacted] 25X1

#### Facility Description

Construction at the impact test facility was first noted on satellite imagery in March 1979, when ground scarring was seen at the control building site. Tree clearing preparatory to erecting the test site enclosure and service tower was first observed in July 1979, and the enclosure and tower were completed in early 1981. All other facility construction, except the drainage collection basin, was 25X1
completed by early 1982. Work on the basin began 25X1
in May 1980 and was finished in 1983. (S [redacted] 25X1
25X1

Page Denied

Next 1 Page(s) In Document Denied

The test facility consists primarily of an unusually configured, sloped-wall enclosure containing an open basin (figure 7). The enclosure, basically a shell surrounding the area above the basin, [redacted] The upper 10 meters of the walls slope inward at a 45 degree angle, and along at least the eastern side of the structure an internal wall slopes approximately 45 degrees inward from the 5-meter level to the ground level. Angled supports for the internal wall were seen along this side of the enclosure during construction. Although we believe similar walls are on the other sides of the enclosure, the sides were not observed at a stage of construction which would have revealed their existence. (S [redacted]

The basin in the enclosure is 18 meters long, 12 meters wide, and 7 meters deep. The basin's walls are 2 meters thick, and were built by erecting two parallel rows of prefabricated concrete panels and filling the area between the panels with some sort of loose material. A removable, three-section cover protects material in the basin against the environment. The traveling crane adjacent to the enclosure is used to remove and replace the cover sections. (S [redacted]

The service tower, which can be moved into and out of the test site enclosure on rails, is a steel framework structure about 44 meters high (figure 7). The lower of the two sections is 15 meters square and 20 meters high. At the 14-meter level of this section is a floor with an approximately 3-meter-square opening in its center. When the tower is positioned over the basin, this floor acts as a kind of roof for the enclosure, and together with the sloped walls almost completely covers the area above the basin. (S [redacted]

The upper section of the service tower is 30 meters high and 6 meters square. This section extends down 6 meters into the center of the lower section, resulting in a height of 44 meters. The upper portion has what may be launch or guide rails attached to two of its sides. The rails probably guide a test device as it is dropped or propelled into the basin (figure 8). (S [redacted]

The test preparation building is 33 meters long, 30 meters wide, and two stories high. The western half of the building is an open bay section probably used for work on the test devices. The eastern half 25X1 of the building consists of two floors of small 25X1 rooms that provide administrative and workshop spaces. The control building is 50 meters long, 18 meters wide, and one story high. Site operations during testing are probably directed from this building. The 20-meter-long by 12-meter-wide L-shaped drainage basin is divided into small cells. This buried basin serves as a temporary retention basin for water runoff emanating from the test facility area. Drainage pipes buried throughout the area during construction connect 25X1 into the basin. Steamlines serve the site enclosure, 25X1 control building and the test preparations building. An unidentified pipeline also leads to the test site enclosure (figure 6). (S [redacted] 25X1

**Test Activity**

Activity that could be testing, facility checkout, or both, was first noted in early 1982 at the impact test facility. In March of that year a probable telescoping arm, which may be an extension of the upper section of the service tower's launch or guide rails, protruded from the tower's center to an 25X1 object on the concrete apron adjacent to the enclosure (figure 8). The fixture—seen on later, better quality imagery—probably holds a test device for final checkout and attachment to the arm before a test occurs within the enclosure. The fixture is an open, thick-walled cylinder approximately 2 meters high, with an outside diameter of about 3 meters and an inside diameter of about 1 meter; it stands upright on four feet. (S [redacted] 25X1

25X1

[redacted] the service tower 25X1 was seen within the test site enclosure, and the three sections of the basin cover were on the adjacent concrete apron under and near the traveling crane, indicating that a test was underway (figure 8). This test was apparently completed by [redacted] when the service tower was seen outside 25X1 the enclosure and the basin was again covered. Another test was noted in July 1982. At that time,

25X1

Page Denied

Next 1 Page(s) In Document Denied

the test device handling fixture and a small probable trailer were present outside the enclosure at the usual pre-test position of the service tower. (S [redacted]

**Function**

While the specific type of testing being conducted at the facility is not clear, the facility's configuration, together with activity observed there since early 1982, provides some insight about the test program. We believe that the basin is a key test feature, and that it probably contains some specially prepared material—whether solid or liquid we are not sure—into which test devices are dropped or propelled from the service tower. The facility's test sequence can also be postulated. First, the device to be tested is probably checked out and instrumented in the test preparation building just before moving to the test facility. The device is then transported to the test site, where it is placed into the handling fixture for attachment to the telescoping arm. After final checkout, the device is raised into the tower by the arm and the cover sections for the basin are removed. Next, the tower is moved over the basin, where the test device is dropped or propelled into the specially prepared material. The tower is removed from the enclosure after the test, and the device is recovered from the basin and returned to the test preparation building for inspection and evaluation. The cover sections are then replaced over the basin, thus completing a test cycle. (S [redacted]

Two systems that might use such testing procedures are surface penetrator systems or spacecraft soft landing systems for either land or water recovery. Of these possibilities, the testing of surface penetrators seems the more likely. In a surface penetrator scenario for the Zagorsk facility, the basin would contain the specially prepared soil and rock media. The penetrator would be launched downward into the basin from the service tower using a high pressure gas, or a small rocket motor. The sloping walls of the enclosure would deflect any throwout material resulting from impact back into the basin or floor area of the enclosure. (S [redacted]

[redacted]

***Surface Penetrators***

*Studies related to the use of surface penetrators for planetary and asteroid exploration have been under way in the US since the mid-1970s. As developed and tested in the US, surface penetrators consist of slender, ogival-nosed cylindrical projectiles that carry sensors and other instruments to a depth of a few meters in soil or rock so that various natural phenomena can be measured in situ. The penetrators typically impact the surface at high velocity—nearly 150 meters per second—and separate into fore and aft sections. The aft section remains on the surface and the fore section, while remaining connected to the aft section by cable, penetrates the surface to the desired depth. The aft section acts primarily as the communications link between the penetrator and an orbiting satellite, but can also house meterological and imaging sensors as well. The fore section contains sensors to measure conditions in the soil or rock such as seismicity, chemical composition, heat flow, and magnetism. Surface penetrator systems, despite their seemingly apparent simplicity, are sophisticated devices that must survive extreme conditions of deployment (e.g. force loads of 20,000 Gs and more) and still perform their intended mission.*[2] *Extensive development and testing programs, therefore, are required to perfect these devices. (C)*

25X1

*Experiments involving the high velocity impact of instrumented penetrators of various shapes and configurations have been conducted in a wide range of earth types. Many of the tests were conducted at test sites using a transportable air gun where the target media, various combinations of soil and rock, were specially prepared and where the experiments could be closely controlled and monitored. Other tests were carried out at unprepared sites using the transportable air gun or by air-dropping to propel the penetrator into the natural soil and rock media environment. (U)*

25X1

[2]One G is the gravitational force acting on a body at sea level, and equals 9.78039 meters/second at 0 degrees latitude. Astronauts typically experience 3 Gs—essentially 3 times their weight at sea level—or less during a normal launch and recovery. An emergency ballistic reentry might result in 8 Gs or so. (U)

25X1
25X1

In a scenario for testing spacecraft soft landing systems, the basin would contain earth or water. The spacecraft, probably a model, would be propelled or simply dropped from the tower at the desired velocity into the basin. (S [redacted]

## Probable Toxic Liquid Waste Treatment-Disposal Facilities

The function of two previously unidentified facilities at the ZMSDC is probably the treatment and disposal of toxic liquid wastes (figure 1). The features of these facilities strongly suggest that they were designed for the treatment and disposal of liquid wastes generated within the ZMSDC, probably during experiments with small quantities of propellant-related chemicals and possibly toxic metals. Furthermore, we believe that the first toxic waste facility (Facility 1) was a functional model for the second (Facility 2) and that the Soviets, after evaluating the performance of Facility 1, decided to build the much more elaborate Facility 2. If these facilities prove successful, they may serve as models for the construction of additional toxic waste treatment and disposal facilities at other missile propellant-related installations. Figures 9-11 compare the construction chronologies of Facilities 1 and 2. (S [redacted]

### Facility 1

Facility 1 was built in the south-central portion of the ZMSDC. Construction was apparently accomplished in two phases, the first from April to August 1978, and the second from March to May 1979. (S [redacted]

Toxic liquid wastes could be delivered to Facility 1 in several ways: directly to the central structure by road vehicles; by rail car via what may be an unloading rack on a new rail spur; or from the terminus of a possible pipeline 200 meters north of the facility adjacent to a tank farm. (S [redacted]

The first phase of construction at Facility 1 involved excavating three straight 60-meter-long trenches that radiated at 90 degrees from each other from a central circular excavation. Short trenches were also excavated perpendicular to the ends of the trenches. These 60-meter-long trenches are probably drainage outlets for liquid effluent after it has been treated in a structure in the central excavation. By May 1978, a circular concrete basin was being built below grade at the facility's center, and dark-toned probable drainage tiles were being emplaced in one of the trenches (figure 9). (S [redacted]

25X1
25X1
25X1
25X1

[redacted] the facility appeared essentially complete; the trenches had been back-filled with earth and a rectangular structure had been built over the circular basin (figure 10). By March 1979, however, the rectangular structure above the basin had been removed. A trench had been excavated from the center of the facility to the north under a newly established rail spur to a point about 200 meters away. The trench's terminus was adjacent to an existing tank farm and parking area for propellant transporters. By April 1979, an unidentified structure was visible at the center of the facility, and a radial pattern of alternating light and dark material was present around the structure (figure 11). The pattern and its relationship to the three known radial drainage outlets suggests that a fourth drainage outlet had been built on the easternmost side of the facility. By May 1979, the radial pattern of light and dark material was still present but not as apparent, and an octagonal shed had been erected around the unidentified structure at the center of the site. The facility appeared to be finished at that time. (S [redacted]

25X1
25X1
25X1
25X1

A possible drain field, an area where a liquid effluent is allowed to seep into the ground, was constructed adjacent to the toxic liquid waste facility, most likely for operational support. Rows of what may be flexible hoses or cables could be seen laying on the field's specially graded surface during this area's construction. Later the hoses or cables were apparently buried. Access to the drain

25X1
25X1

Page Denied

Sanitized Copy Approved for Release 2010/12/17 : CIA-RDP91T01115R000100320004-6

field is gained through a small road-served structure near the south side of the facility. The construction timing of this area and its proximity to what is probably the toxic liquid waste facility lead us to suspect that the two areas are related, although we have not detected a direct connection between them. (S [redacted]

**Facility 2**

A second, more elaborate site that is probably a toxic liquid waste treatment facility has been built next to the north side of the ZMSDC. Facility 2 is similar to Facility 1 in both appearance and construction technique. It consists of what is probably a central waste treatment building connected to an array of eight radial drainage outlets. (S [redacted]

Early activity related to the facility was noted in February 1981. At that time, a road was being built to its construction site from near the entrance to the ZMSDC along the outside of the northern perimeter fence. By March 1982, most of the radial trenches had been excavated and dark-toned probable drainage tiles were present in several of the trenches. Short trenches perpendicular to the ends of some of the arms were also present. Additionally, a circular concrete basin was being built below grade at the center of the array, a control and monitoring building was under construction at the southwest corner, and pipeline trenches were being excavated within the ZMSDC proper adjacent to the treatment facility (figure 9). A conduit had also been emplaced between the control and monitoring building and the central area of the facility. (S [redacted]

By May 1982, some of the trenches had been backfilled and a rectangular structure was being erected around and over the circular concrete basin (figure 10). What were probably dark-toned drainage tiles could be seen in some of the trenches, and a disruption in the earth and solid perimeter fence next to the control and monitoring building indicated that a connection had been made to the pipeline trenches seen within the facility two months earlier. (S [redacted]

The facility was externally complete by early 1983. By June, a radial pattern of alternating light-and dark-toned material similar to that at the first facility could be seen (figure 11). The only connections between Facility 2 and the ZMSDC are the buried probable pipeline and a steamline leading to the control and monitoring building. No direct vehicular or personnel access is provided to the facility from the ZMSDC. A temporary housing area built for construction workers has deteriorated since Facility 2's completion, and no additional construction is expected in this area. (S [redacted]

25X1

25X1

25X1

25X1

25X1

25X1

25X1

Page Denied

Next 1 Page(s) In Document Denied